$$A_a = \sum_{\text{region}} \sum \Delta y \, \Delta x = \sum_{\text{region}} \sum \Delta x \, \Delta y$$

For convenience let $\Delta A = \Delta y \, \Delta x$. Now intuition leads the student to believe the true result that

$$\lim_{\Delta A \to 0} \sum \sum \Delta A = \int_a^b \int_0^{f(x)} dA = \int\int dy \, dx.$$

The point here is that by developing the student's intuition one can build insight that can lead to understanding rather than memorization and frustration. It is after a concept is understood that formal proof should fit into advanced placement calculus. Rigor is important in mathematics and must not be totally omitted. However, a rigorous approach without a foundation in understanding is time wasted for most students.

WORD PROCESSING: A TEACHER'S AIDE

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With the growing presence of microcomputers in colleges and schools, used both administratively and for computer-assisted instruction(CAI), their use outside the classroom by teachers becomes more common. Whether the micro is at home or at school, it can be of considerable assistance, especially when the amount of work to be done exceeds the time in which to do it.

Many teachers, particularly in mathematics, are already acquainted with the value of computers for teaching mathematics and for student use in writing programs, entering formulas and solving problems. What is important, however, is to know that there are other microcomputer applications which make the teacher's work faster, more accurate, more uniform and much easier.

In addition to grading and record keeping, or developing CAI materials, the micro can be of great help if you have access to word processing. Some specific advantages to the use of word processing are:

- It is easy to make multiple copies of documents, or store them for future use.
- Changing or updating material is easy.
- It is easy to assemble several documents in different ways.
- Work has to be typed only one time and corrections are quick and easy.

Working with word processors involves continual discovery of new uses to which it can be applied, limited only by storage capacity, printer quality and one's imagination.

Following are some of the handy features which word processors provide for teachers:

1. Course outlines and syllabi can be entered into storage one time, then called up and changed for each new term. All that is necessary is to change dates, perhaps office hours, reading requirements and the like. Most printers attached to micros easily accomodate spirit masters for duplication purposes.
2. Course handouts can be constructed and stored until they are to be used and can be assembled from a large library of materials into course or term-specific groupings.
3. Student biographical information can be retained, updated and printed out in a variety of formats.
4. Letters to parents or reports to administrators can be developed in parts and assembled as needed, then printed in one copy or multiple copies.
5. Tests can be written and stored, then printed out. If it is important to change tests term-to-term, a large file of questions can be developed for each study unit or text chapter and a more-or-less random printing of a smaller number of questions can be produced each time the test is given. It is also easier to switch questions or sections around so tests are not repeated in succeeding terms.
6. With some word processing software, it is possible to add subsidiary data bases that allow much more powerful information management, manipulation and printing. Linking word processors to accounting or spread-sheet software can make it possible to record student grades, compute averages, print out final grade reports and even perform statistical tests, using the word processor to format and print the output.

Word processors vary in ability and price, but even the less expensive ones can perform most of the tasks which will help instructors and allow enough flexibility for the imagination to create new word-processor uses.

Once the teacher has mastered word processing, it will be time to begin familiarizing students with the capabilities of microcomputers, and the logical connection between words on a page and the method of producing that product via a computer provides a useful way to begin. Most word-processing packages are designed to be as "user friendly" as possible and working with them is one way to get students involved in improving their classroom work, assignments and papers.

With microcomputers appearing more frequently in schools and colleges, it is important that teachers take as much advantage of them as possible. Using word processors to make repetitive work easier and of higher quality is a definite way to use them to advantage.

DATES TO REMEMBER

April 5-7, 84 OCTM Annual Meeting in Middletown
April 25-28, 1984 62nd Annual NCTM Meeting in San Francisco
August 24-30, 1984 ICME 5 Meeting in Adelaide, Australia
November 1-3, 1984 NCTM Regional Meeting in Memphis
April 17-20, 1985 63rd Annual NCTM Meeting in San Antonio

"Why should long chains of pure reasoning produce such remarkably applicable conclusions? This is the greatest paradox in mathematics." Morris Kline

"The mathematician's patterns, like the painter's or the poet's, must be beautiful; the ideas, like the colors or the words, must fit together in a harmonius way. Beauty is the first test; there is no permanent place in the world for ugly mathematics."
G.H.Hardy

(The above two quotes were taken from the Missouri Council of Teachers of Mathematics Bulletin)